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Datasheet for the decision of 11 January 2007

Case Number: T 1016/04 - 3.3.09

Application Number: 95901221.2

Publication Number: 0728166

IPC: C09J 133/00

Language of the proceedings: EN

Title of invention:
Pressure sensitive adhesives

Applicant:
MINNESOTA MINNING AND MANUFACTURING COMPANY

Opponent:
BASF Aktiengesellschaft, Ludwigshafen

Headword:
-

Relevant legal provisions:
EPC Art. 54, 56, 83

Keyword:
"Amended main request:
Sufficiency of disclosure (yes) - Novelty (yes) - Inventive step (yes)"

Decisions cited:
-

Catchword:
-

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Case Number: T 1016/04 **-** 3.3.09

D E C I S I O N
of the Technical Board of Appeal 3.3.09
of 11 January 2007

Appellant: (Patent Proprietor)
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Respondents: (Opponent)
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Decision under appeal:
Decision of the Opposition Division of the European Patent Office posted 14 June 2004 revoking European patent No. 0728166 pursuant to Article 102(1) EPC.

Composition of the Board:

Chairman: P. Kitzmantel
Members: J. Jardón Alvarez
M.-B. Tardo-Dino

Summary of Facts and Submissions

I. The grant of European patent No. 0 728 166 in respect of European patent application No. 95901221.2 in the name of MINNESOTA MINING AND MANUFACTURING COMPANY, which had been filed on 10 November 1994, was announced on 27 February 2002 (Bulletin 2002/09) on the basis of 13 claims. Independent Claims 1 and 13 read as follows:

"1. A pressure sensitive adhesive comprising the reaction product of starting materials comprising:

(a) 25-97 parts by weight of an acrylic acid ester of a monohydric alcohol having 4-18 carbon atoms whose homopolymer has a T_g less than 0°C;
(b) 3-75 parts by weight of a non-polar ethylenically unsaturated monomer whose homopolymer has a solubility parameter of no greater than 10.50 and a T_g greater than 15°C; and
(c) 0-5 parts by weight of a polar ethylenically unsaturated monomer whose homopolymer has a solubility parameter of greater than 10.50 and a T_g greater than 15°C,

the relative amounts of said acrylic acid ester, said non-polar ethylenically unsaturated monomer, and said polar ethylenically unsaturated monomer being chosen such that the 90° peel adhesion of said reaction product to a polypropylene surface is at least 700 g/cm (2 lbs/0.5 in.) after a 72 hour dwell at room temperature as measured according to Test Procedure B-I.

13. The use of pressure sensitive adhesive according to anyone of claims 1 to 12 to provide vibration dampling (sic) articles."

Claims 2 to 12 were dependent claims.

II. A Notice of Opposition was filed against the patent by BASF Aktiengesellschaft on 18 October 2002. The Opponent requested the revocation of the patent in its full scope based on Article 100(a) EPC (lack of novelty and inventive step) and Article 100(b) EPC (insufficiency of disclosure).

The opposition was supported by the following documents:

D1: US - 4 316 830

D2: EP - A - 0 127 834

D3: EP - A - 0 194 881

D4: EP - A - 0 212 358

D5: EP - A - 0 258 753

D6: EP - A - 0 351 193

D7: EP - A - 0 395 990

D8: EP - A - 0 386 325

D9: WO - 92/01761

D10: EP - A - 0 625 557

D11: JP -A - 02070781 (abstract)

D12: JP - A - 04298586 (abstract)

D13: Robert F. Fedors, Polymer Engineering and Science, Vol. 14(2), 1974, pages 147 - 154 and

D14: WO - A - 93/15333

III. By its decision dated 14 June 2004, the Opposition Division revoked the European patent because the claimed subject-matter was not considered novel (Article 54 EPC) and because the invention was not considered disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art (Article 83 EPC).

The Opposition Division found that the subject-matter of the then pending claims, the granted claims, was not novel over the disclosure of D1, D3 - D9, D11 and D12.

Concerning sufficiency of disclosure, the Opposition Division held that the patent in suit failed to sufficiently disclose (i) the determination method of the solubility parameter of a solid polymer and (ii) a general technical concept which would enable the skilled person to achieve the envisaged result, namely to obtain a pressure sensitive adhesive having a given 90° peel adhesion to a propylene surface, without undue difficulty, within the whole ambit of the claim.

IV. On 9 August 2004 a Notice of Appeal was filed by the Patent Proprietor (Appellant) against the decision of the Opposition Division and the appeal fee was paid on the same day.

With the Statement of Grounds of Appeal filed on 18 October 2004, the Appellant filed four sets of amended claims, a main request and three auxiliary requests. The Appellant requested that the appealed decision be set aside and that the patent be maintained on the basis of the main request or, failing that, on the basis of one of the auxiliary requests 1 to 3.

V. In response to the Board's communication, issued on 13 October 2006 in preparation for the oral proceedings, the Appellant filed with letter dated 8 December 2006:

(D15): a list of patents referring to Fedor's article (D13)

(D15a): EP - A - 0 217 863

(D15b): US - 4 525 363 and

(D16): a calculation of the Fedor's solubility parameter for several ethylenically unsaturated monomers.

VI. During the oral proceedings held before the Board on 11 January 2007, after the discussion on inventive step of the main request and the auxiliary request 1, the Appellant withdrew all the previous requests and filed a set of claims for a new main request based essentially on its previous auxiliary request 2 with

deletion of the compounds "t-butyl acrylate, ethylmethacrylate and propylmethacrylate" from the definition of the component (b). Claim 1 of this new main request reads as follows:

"1. A pressure sensitive adhesive comprising the reaction product of starting materials comprising:

(a) 25-97 parts by weight of an acrylic acid ester of a monohydric alcohol having 4-18 carbon atoms whose homopolymer has a T_g less than 0°C.

(b) 3-75 parts by weight of a non-polar ethylenically unsaturated monomer selected from the group consisting of 3,3,5 trimethylcyclohexyl acrylate, cyclohexyl acrylate, isobornyl acrylate, N-octyl acrylamide, and combinations thereof;

(c) 0-5 parts by weight of a polar ethylenically unsaturated monomer selected from the group consisting of acrylic acid, itaconic acid, N,N-dimethylacrylamide, N-vinyl-2-pyrrolidone, N-vinyl caprolactam, acrylonitrile, tetra-hydrofurfuryl acrylate, glycidyl acrylate, 2-phenoxyethylacrylate, benzylacrylate, and combinations thereof,

the relative amounts of said acrylic acid ester, said non-polar ethylenically unsaturated monomer, and said polar ethylenically unsaturated monomer being chosen such that the 90° peel adhesion of said reaction product to a polypropylene surface is at least 700 g/cm (2lbs/0.5 in.) after a 72 hour dwell at room temperature as measured according to Test Procedure B-I."

VII. The arguments presented by the Appellant in its written submissions and at the oral proceedings may be summarized as follows:

The documents cited in the appealed decision all disclosed compositions containing methylmethacrylate. The subject-matter of amended Claim 1 which was directed to compositions without methylmethacrylate was therefore novel.

Concerning Article 83 EPC, it pointed out that the patent gave the nature of the components (a), (b) and (c) to be used in the claimed adhesives, the relative amounts of each component, and examples of how an adhesive was to be obtained and how the 90° peel adhesion test (procedure B-1) was to be performed.

The value of 700 g/cm for the 90° peel adhesion to a polypropylene surface was considered the minimum value at which good adhesion was achieved. Table I-3 in the patent included several examples (examples 1 - 12, 16 and 19 - 21) of adhesives having a 90° peel adhesion higher than 700 g/cm. The table also included comparative examples (examples 13 - 15, 17, 18, 22 and 23) wherein a lower value was obtained. The Appellant pointed out that the skilled person knew that the adhesion was related to the glass transition temperature of the starting monomers and would know how to modify their relative amounts to obtain an adhesive with the desired peel adhesion.

Concerning inventive step, the Appellant considered D9 as the closest prior art. It saw the problem to be solved as to provide pressure sensitive adhesives which exhibit both a good adhesion to high and low energy surfaces whilst keeping good cohesive strength properties (i.e. shear strength). The solution to this problem, namely the adhesives of Claim 1 which did not contain any tackifier and were not neutralized, was in its opinion non obvious in view of D9 alone or in combination with any of the further documents cited by the Respondent.

VIII. The Respondent did not file any written substantive submission during the appeal proceedings.

During the oral proceedings it raised several objections against the sets of claims filed by the Appellant with letter of 18 October 2004 which are now withdrawn. Concerning the present main request, the Respondent did not contest its admissibility into the proceedings and it did not comment on its merits.

IX. The Appellant requested that the decision under appeal be set aside and the European patent No. 0 728 166 be maintained on the basis of the Claims 1 to 10 of the main request as filed during the oral proceedings.

The Respondent requested that the appeal be dismissed.

Reasons for the Decision

1. The appeal is admissible.

2. *Amendments (Article 123 EPC)*

2.1 Amended Claim 1 is based on Claim 1 as originally filed wherein the non-polar ethylenically unsaturated monomer (b) has been defined using the compounds recited in Claim 16 as originally filed, except for t-butyl acrylate; and the polar ethylenically unsaturated monomer (c) has been defined in accordance with originally filed Claim 17.

The Board is therefore satisfied that the amendments do not introduce subject-matter which extends beyond the contents of the application as originally filed (Article 123(2) EPC).

2.2 Amended Claim 1 is clearly limited over the granted Claim 1 and fulfils therefore also the requirements of Article 123(3) EPC.

2.3 Claims 2 to 10 have only been editorially amended to be brought into line with Claim 1. They also fulfil the requirements of Article 123 EPC.

3. *Sufficiency of disclosure (Article 83 EPC)*

3.1 The Opposition Division stated in the appealed decision that the requirements of Article 83 EPC were not fulfilled because the patent failed:

(i) to disclose the determination method of the solubility parameter for solid polymers and

(ii) because it was not possible to carry out the invention within its whole ambit claimed due to

the use of a functional definition (the relative amounts of the reactant being chosen to achieve a certain adhesion).

3.2 The amended claims no longer include the solubility parameter to define the non-polar/polar ethylenically unsaturated monomers. This parameter has been replaced by the list of monomers to be used. Thus, the first objection does not apply to the present request.

3.3 Concerning (ii), it is noted that table I-3 of the patent includes 23 working examples for the preparation of pressure sensitive adhesives using monomers of Claim 1. According to said table, a 90° peel adhesion to a polypropylene surface higher than 700 g/cm can be obtained for each of the four non-polar ethylenically unsaturated monomers (b) covered by the claims (see examples 1 to 12, 16 and 19 to 21). Table I-3 also provides information concerning the influence of the relative amounts of the monomers on the 90° peel adhesion (see the groups of examples 7-9, 14-16 and 17-21).

During the oral proceedings, the Appellant stated that, it was within the common general knowledge of the skilled person that an insufficient peel strength could be cured by appropriately varying the relative amounts of the monomers, taking account of the well known glass transition temperature requirements of pressure sensitive adhesives. Thus the skilled person would know, through the evaluation of the initial failures, how to react in order to transform initial failure (see comparative examples 13-15, 17, 18, 22 and 23) into success.

This assertion of the Appellant was not disputed by the Respondent during the oral proceedings and the Board sees no reason to disagree.

3.4 For these reasons the Board is satisfied that it is possible for the skilled person to carry out the invention in the whole area claimed without undue burden and consequently the requirements of Article 83 EPC are met.

4. *Novelty (Article 54 EPC)*

4.1 None of the cited documents discloses a pressure sensitive adhesive as claimed on Claim 1 comprising the reaction product of starting materials (a), (b) and optionally (c) in relative amounts such that the 90° peel adhesion value is at least 700 g/cm.

Furthermore, the subject-matter of the present claims has been limited and no longer covers the use of methyl methacrylate as component (b). Consequently, the documents D1, D3 - D9, D11 and D12 cited in the appealed decision as disclosing adhesive compositions including methyl methacrylate are no longer novelty destroying for the subject-matter of the amended claims.

4.2 The subject-matter of the claims is thus novel (Article 54 EPC).

5. *Inventive step (Article 56 EPC)*

5.1 The patent in suit provides pressure sensitive adhesives which exhibit good adhesion to low energy

surfaces such as plastics and to high energy surfaces such as stainless steel. They also show good cohesive strength (shear).

5.2 Closest prior art.

5.2.1 Acrylate based pressure sensitive adhesives are well known in the art. Documents D1 to D9, D11 and D12 all describe adhesive compositions including a (meth)acrylic acid component.

5.2.2 From these documents, document D9, which discloses pressure adhesive compositions having a structure similar to the claimed compositions and which may be used on different types of substrates, can be considered as the closest prior art.

5.2.3 D9 discloses in Claim 1 a pressure sensitive adhesive composition comprising a latex of an acrylic copolymer formed by polymerizing a mixture comprising a lower (C_1 - C_3) alkyl (meth)acrylate ester, an upper (C_4 or more) alkyl (meth)acrylate ester and a (meth)acrylic acid; a tackifying resin; and a base to obtain a pH from 6.5 to 8. The neutralized adhesives of D9 show a good adhesion to high energy surfaces such as stainless steel and to low energy surfaces such as polyethylene (see page 11, lines 1 to 15 and pages 14 to 17, examples).

5.3 Problem to be solved and its solution.

5.3.1 The technical problem to be solved by the patent in relation to said prior art can thus be formulated as to provide an alternative pressure sensitive adhesive exhibiting both a good adhesion to low and high energy

surfaces whilst maintaining good cohesive strength properties.

5.3.2 This problem is solved by the adhesives according to Claim 1 including specific amounts of an acrylic acid ester of an alcohol having 4 to 18 carbon atoms, a non-polar ethylenically unsaturated monomer selected from the group consisting of 3,3,5-trimethylcyclohexyl acrylate, cyclohexyl acrylate, isobornyl acrylate and N-octyl acrylamide, and, optionally, a polar ethylenically unsaturated monomer.

5.3.3 As already discussed above under 3.3, the results of the examples in the specification credibly demonstrate that the invention leads to adhesives having a good adhesion (at least 700 g/cm 90° peel adhesion) to low energy surfaces without impairing the adhesion to high energy surfaces. In addition, they show good cohesive strength properties. The claimed adhesives do not require either the mandatory presence of a tackifying resin or neutralization to a given pH.

5.4 Obviousness

5.4.1 The question which remains to be decided is whether this solution involves an inventive step.

5.4.2 There is no suggestion in D9 or in any other of the cited documents that by virtue of incorporating any of the specific non-polar ethylenically unsaturated monomers (component (b)) not covered by D9, further adhesives having good adhesion to high and low energy surfaces as well as good cohesion could be obtained.

5.5 Hence, the Board considers that, in the light of the cited prior art, it would not have been obvious to a person skilled in the art, to arrive at the adhesives as claimed on Claim 1.

5.6 The subject-matter of Claim 1, as well as the subject-matter of Claim 10 which relates to the use of the adhesives of Claim 1, involves an inventive step within the meaning of Article 56 EPC. Claims 2 to 9 are dependent claims and therefore also satisfy the requirements of Article 56 EPC.

6. In summary, the grounds of opposition do not prejudice the maintenance of the patent in the form as amended according to the new main request.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the Opposition Division with the order to maintain the patent on the basis of Claims 1 to 10 as filed during the oral proceedings, after any necessary consequential amendment of the description.

The Registrar: The Chairman:

G. Röhn P. Kitzmantel